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Embedding Green ICT Maturity in Organisations

Hankel, A.C.

2020

document version

Publisher's PDF, also known as Version of record

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citation for published version (APA)

Hankel, A. C. (2020). *Embedding Green ICT Maturity in Organisations*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].

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E-mail address:

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English Summary

The transition to a low-carbon society is one of the great challenges of the 21st century. ICT can play a humble but significant part of this transition. As a general-purpose technology, it can be a part of many solutions that help us closer to an ecological footprint that is within the carrying capacity limits of our planet. Therefore, we ask how individuals and organisations can put ICT to green use.

Information and communication technologies (ICT) are a powerful force for change in society. They impact the way we work, live and play on different levels. The scientific advances in computer technologies and the widespread use of telecommunication have made information exchange virtually free and independent of geographical distance. Being able to exchange information freely, and perhaps more importantly, automatically and intelligently, are currently important drivers for efficiency gains. It is therefore no surprise that many innovations in products, services, processes, and so on, have an important ICT component. In other words, ICT is can be found in many places and many things are becoming connected. These innovations and the omnipresence of ICT bring efficiency gains in terms of sustainability. However, ICT is also part of the environmental problems we have, as exemplified by enormous data centres and all the network equipment needed to keep us connected and let us make use of the Internet. As is the case for any other goods we use, ICT requires materials and energy to function: the footprint of ICT that should be minimised.

The field of green ICT is associated with minimising the problems and optimising the solutions associated with ICT and its environmental impact. Most consider the global environmental impact of ICT to be around 2% and growing fast. These 2% only include the negative impact of ICT, meaning that the solution space of the positive enabling impact is 98%. Using ICT as an enabler for efficiency in other processes could lead to a reduction in the global footprint of 20%. Even though we need to work on energy efficiency continuously, the promise of green ICT is therefore that the net environmental impact of ICT will be a considerably positive one.

Unfortunately, it seems that whenever ICT researchers and professionals discuss the environmental impact of ICT, most of the efforts go towards the direct impact. In our literature reviews, we confirmed this strong bias and identified gaps in other areas of green ICT; there are many aspects of green ICT that are not well studied (from the organisational perspective). If the effects of ICT as a solution can be that much greater than reducing the problematic side of ICT, it makes sense to shift efforts from reducing the 2% to help to reduce the other 98%. It is this gap that motivated this research. The goal of this thesis is to contribute towards making green ICT in its entirety more accessible to organisations: we asked how organisations can make use of the full potential of green ICT.

To address this question, we used a green ICT maturity model (SGIMM) that

was developed by SURF, the Dutch higher education and research partnership for ICT. This model was developed based on expert views and opinions and validated through a survey spread amongst practitioners. An important requirement for the model was that it should include both the ‘problem’ and ‘solution’ parts of green ICT. The SGIMM is designed to give organisations insights into the maturity of green ICT of the organisation. It is established as a self-assessment and enables organisations to have an internal dialogue, to reach agreement on the status quo and to define actions for improvement.

We followed a number of organisations from the green ICT community which were willing to use the maturity model and to assess its use in practice. In order to assess whether organisations would be successful in embedding green ICT, it is not only necessary to have a tool such as the SGIMM being used to satisfaction, but also to actually see green ICT solutions be adopted. Both individuals and organisations as a whole, were positive on the use of the maturity model. The results show that the model delivers specific suggestions for improvement both in reducing the environmental footprint of ICT and on using ICT as a green solution for business processes. Individual participants reported an increase in awareness on what green ICT can do. Therefore, the model increased awareness, inspired to take action and was insightful.

A year later, we returned to the participating organisations to see how they made use of the results and whether they successfully adopted green ICT practices. We saw little progress and found that many factors influence the adoption of green ICT. An organisation needs strategic alignment on all the (management) layers; bottom-up enthusiasm as well as leadership from the top; and a sense of shared responsibility. The key insight is that green ICT requires a systemic approach from the organisation because it affects the workflow of all members of the organisation and every process they conduct. It cannot be delegated to a few individuals without taking some (shared) responsibility. As long as members or groups are not willing to look beyond their own tasks, organisations cannot grow much more mature and are limited in their adoption of green ICT. Because ICT departments often position themselves as support (followers, not leaders), this proves to be a big hurdle in the adoption of green ICT.

Working with the SGIMM, we found that many people were enthusiastic about the use of the tool. However, a good tool does not mean it will be used. Following the organisations in our field study, we saw that it was difficult to adopt green ICT solutions; they were not entirely ready. Getting organisations to make use of the potential of green ICT, requires a systemic approach, it requires us to collaborate, to look at a larger picture from whichever system is being considered. In terms of the organisations, what is best for the organisation might not be best for the ICT department. Similarly, what is best for society, might not be best for an organisation. This systemic interaction is intrinsically connected to

English Summary

the concept of sustainability; at the same time it is difficult for many of us to approach sustainability in this way. However, this is what we have to do if we want to transition to a sustainable low-carbon society.